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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,172	04/19/2007	Walter Schuetz	825-49	4612
23685	7590	05/26/2009		
KRIEGSMAN & KRIEGSMAN 30 TURNPIKE ROAD, SUITE 9 SOUTHBOROUGH, MA 01772			EXAMINER LAWRENCE JR, FRANK M	
			ART UNIT	PAPER NUMBER
			1797	
			MAIL DATE	DELIVERY MODE
			05/26/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/578,172

**Applicant(s)**

SCHUETZ ET AL.

**Examiner**

Frank M. Lawrence

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
- Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: References to specific claims should be removed from pages 1 and 3 because the claim can be canceled, renumbered, or amended during prosecution. The use of section headings such as "Brief Description of the Drawings" is suggested but not required. Page 27 contains a footnote that should be deleted.

Appropriate correction is required.

2. Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. It appears that claim 9 recites nothing that is not already present in claim 1.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-13, 15, 16, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 3 and 4 are indefinite because they recite "at least one heat exchanger" but are unclear as to whether this refers to the heat exchanger introduced in claim 2. It is suggested that the phrase be changed to "said heat exchanger." In claims 1, 15, 16 and 20, the term "loading/emptying" is indefinite because it is unclear whether the "/" refers to

"and," "or," or "and/or." It is assumed that the term should be "loading and/or emptying," which is used in claim 6 and the specification. Claim 15 is indefinite because it is unclear what "the latter" refers to in lines 1-2. The other listed claims are indefinite for depending from a rejected parent claim.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6, 9 and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese reference (JP 63-140200 A).
7. JP '200 teaches a hydrogen storage device comprising a hydrogen storage container (11) with two connections for loading and emptying hydrogen, a porous hydrogen adsorption material (1) in the container, a recirculation circuit with a pump (3) for recycling hydrogen released from the container outlet back to its inlet, and a heat exchanger (2) for cooling hydrogen in the circuit during hydrogen sorption (loading) and heating the hydrogen during desorption (emptying) (see abstract, figures).
8. Claims 1, 2, 4-6, 9, 14-16 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese reference (JP 60-113898 A).
9. JP '898 teaches a hydrogen storage device comprising a hydrogen storage container (1) with two connections (6,7) for loading and emptying hydrogen, a porous hydrogen adsorption material (3) in the container, a recirculation circuit with a pump (15) for recycling hydrogen

released from the container outlet back to its inlet, and a heat exchanger (16) for heating the hydrogen during desorption (emptying) (see abstract, figure 1).

10. Claims 1-3, 5, 6, 9, 14-17, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Stedman et al. (5,202,195).

11. Stedman et al. '195 teach a hydrogen storage device comprising a hydrogen storage container (20) with two connections for loading and emptying hydrogen, a porous hydrogen adsorption material (21) in the container, a recirculation circuit with a pump (23) for recycling hydrogen released from the container outlet back to its inlet, and a heat exchanger (31) for cooling hydrogen in the circuit during hydrogen sorption (loading) (see figure 1, abstract, col. 5, lines 50-67, col. 6, lines 48-67, col. 7, lines 56-67).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP '898, JP '200, or Stedman et al. '195 in view of Meinzer (5,360,461).

14. Any one of JP '898, JP '200, or Stedman et al. '195 discloses all of the limitations of the claims except that the sorbent is a pressed composite including carbon and a thermally conductive additive, and that there is a device for conducting electrical current through the sorbent. Meinzer '461 discloses a composite sorbent including a carbon based polymer adsorbent that is mixed with metal hydride and pressed into blocks or sheets that can be heated

using and electric current applied to electrodes (12) (see col. 3, line 42 to col. 4, line 53, col. 5, lines 13-20, col. 5, line 57 to col. 6, line 7). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of any of the primary references by substituting the storage material and electric heater of Meinzer '461 in order to provide a sorbent that combines physical and chemical storage mechanisms to achieve higher net energy densities and to use a heater that does not require a coolant fluid loop.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP '898, JP '200, or Stedman et al. '195 in view of Zaluska et al. (5,882,623).

16. Any one of JP '898, JP '200, or Stedman et al. '195 discloses all of the limitations of the claim except that there is a device for introducing microwaves into the sorbent. Zaluska et al. '623 disclose a device for applying microwave energy to induce hydrogen adsorption from a metal hydride (see abstract, col. 2, lines 49-64). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the device of any of the primary references by using a microwave heater in order to provide induced desorption at high efficiency and lower temperatures due to excitation of bonds in the hydrides.

#### ***Allowable Subject Matter***

17. Claims 7 and 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional references listed on the attached PTO-892 form disclose heat

exchange arrangements for hydrogen storage systems, or were cited on the international search report.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161. The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Frank M. Lawrence/  
Primary Examiner, Art Unit 1797